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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/670,330 | 09/26/2003 | Kenichi Kadota | 243329US2 | 5106 |
| 22850 | 7590 | 10/06/2005 | EXAMINER | |
| OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314 | | | SUN, XIUQIN | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 2863 | |

DATE MAILED: 10/06/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/670,330

Applicant(s)

KADOTA, KENICHI

Examiner

Xiuqin Sun

Art Unit

2863

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 July 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-6, 9-13 and 15-19 is/are rejected.
- 7) ☒ Claim(s) 7, 8, 14 and 20 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 September 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
 - 2) ☐ Certified copies of the priority documents have been received in Application No. _____.
 - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-6, 9-13 and 15-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shimada et al. (U.S. Pub. No. 20040073327) in view of Chen et al. (U.S. Pat. No. 5726920).

In regard to claims 1, 9 and 15:

Shimada et al. teach a system, method and computer program product for detecting failure of manufacturing apparatuses (Abstract), comprising: a low-yield detecting portion which identifies a low-yield-period apparatus having a significantly lower yield period compared with other manufacturing apparatus and the significantly lower yield period by comparing yields of a plurality of manufacturing apparatuses used in parallel in a specific manufacturing process for each time period when the manufacturing apparatuses were used (sections 0020-0022 and 0186-0187); a warning issuing portion which issues multi-level warnings to the low-yield-period apparatus and the downward-tendency apparatus (section 0186); and a yield data storing portion which stores yield data of the plurality of manufacturing apparatuses for each time period when the manufacturing apparatuses were used (sections 0074 and 0079).

Shimada et al. do not mention explicitly: a downward-tendency detecting portion which identifies a downward-tendency apparatus having a significant downward tendency in yield compared with the other manufacturing apparatus by comparing recent yield trends of the plurality of manufacturing apparatuses.

Chen et al. teach a mass-production style semiconductor wafer testing system and method, including: a downward-tendency detecting portion which identifies a downward-tendency apparatus having a significant downward tendency in yield compared with the other manufacturing apparatus by comparing recent yield trends of the plurality of manufacturing apparatuses (col. 26, lines 26-44 and lines 56-67; col. 27, lines 1-15; col. 28, lines 50-67 and col. 29, lines 1-23).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to include the teaching of Chen et al. in the invention of Shimada et al. in order to provide a mechanism for monitoring the trend of deteriorations in production-lines and predicting possible failure of manufacturing apparatuses (Chen et al., col. 26, lines 56-67 and col. 27, lines 1-15).

In regard to claims 2-4:

Shimada et al. further teach: wherein the low-yield detecting portion comprises: a parallel-period detecting portion which detects a time period when the plurality of manufacturing apparatuses were used in parallel (sections 0079, 0080, 0184 and 0185); a yield threshold determining portion which detects one of the manufacturing apparatuses having a low yield period when yields are lower than a yield threshold value and the low yield period (sections 0186 and 0187); and a low-yield identifying

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portion which identifies one of the manufacturing apparatuses having a significant difference in yield from the other manufacturing apparatus during the low yield period as the low-yield-period apparatus, and identifies the low yield period as being the significantly lower yield period (sections 0186 and 0187); wherein the yield threshold determining portion comprises: a good/defective determining portion which determines whether a group of processed objects is good or defective by comparing a yield of a group of objects processed by one of the manufacturing apparatuses with the yield threshold value (sections 0070, 0084, 0092 and 0126); and a consecutive-fail determining portion which identifies a certain period as being the low yield period when a plurality of groups of the processed objects are determined to be substantially consecutively defective for the certain period (sections 0186); wherein the low-yield identifying portion determines whether or not only one of the manufacturing apparatuses is a low-yield-period apparatus during the significantly lower yield period (sections 0186 and 0187).

In regard to claims 5, 12 and 18:

Shimada et al. teach the subject matter discussed above. Shimada et al. do not mention explicitly: a trend threshold determining portion which detects one of the manufacturing apparatuses which has a downward tendency in recent yield trend compared with a yield-trend threshold value; and a downward-tendency identifying portion which identifies one of the manufacturing apparatuses which has a significant difference in recent yield trend from the other manufacturing apparatus as the downward-tendency apparatus.

Chen et al. further teach: a trend threshold determining portion which detects one of the manufacturing apparatuses which has a downward tendency in recent yield trend compared with a yield-trend threshold value; and a downward-tendency identifying portion which identifies one of the manufacturing apparatuses which has a significant difference in recent yield trend from the other manufacturing apparatus as the downward-tendency apparatus (col. 28, lines 50-67 and col. 29, lines 1-22).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to include a trend threshold determining portion, as taught by Chen et al., in the invention of Shimada et al. in order to provide an effective mechanism for monitoring the trend of deteriorations in production-lines and predicting failure of manufacturing apparatuses (Chen et al., col. 26, lines 56-67 and col. 27, lines 1-15).

In regard to claims 6, 13 and 19:

Shimada et al. teach the subject matter discussed above. Shimada et al. do not mention explicitly: the warning issuing portion issues the warnings of levels depending on whether or not the significantly lower yield period of the low-yield-period apparatus is currently continuing, and whether or not the low-yield-period apparatus has a significant downward tendency in yield compared with the other manufacturing apparatus.

Chen et al. further teach: the warning issuing portion issues the warnings of levels depending on whether or not the significantly lower yield period of the low-yield-period apparatus is currently continuing, and whether or not the low-yield-period apparatus has a significant downward tendency in yield compared with the other manufacturing apparatus (col. 16, lines 57-67 and col. 17, lines 1-44).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to include the teaching of Chen et al. in the invention of Shimada et al. in order to provide an effective mechanism for predicting failures of manufacturing apparatuses through which respective alarm condition can be defined and issued in levels depending on the severity of the failure (Chen et al., col. 16, lines 57-67 and col. 17, lines 1-44).

In regard to claims 10, 11, 16 and 17:

Shimada et al. further teach: wherein identifying the low-yield-period apparatus and the significantly lower yield period comprises: detecting a time period when the plurality of manufacturing apparatuses were used in parallel (sections 0079, 0080, 0184 and 0185); detecting one of the manufacturing apparatuses having a low yield period when yields are lower than a yield threshold value and the low yield period sections 0186 and 0187); and identifying one of the manufacturing apparatuses having a significant difference in yield from the other manufacturing apparatus during the low yield period as the low-yield-period apparatus, and identifying the low yield period as being the significantly lower yield period (sections 0186 and 0187); wherein detecting one of the manufacturing apparatuses having a low yield period when yields are lower than a yield threshold value and the low yield period comprises: determining whether a group of processed objects is good or defective by comparing a yield of a group of objects processed by one of the manufacturing apparatuses with the yield threshold value (sections 0070, 0084, 0092 and 0126); and identifying a certain period as being

the low yield period when a plurality of groups of the processed objects are determined to be substantially consecutively defective for the certain period (section 0186).

Allowable Subject Matter

3. Claims 7, 8, 14 and 20 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Reasons for Allowance

4. The following is an examiner's statement of reasons for allowance:

The primary reason for the allowance of claims 7, 14 and 20 is the inclusion of the limitation of an event/operation condition examining portion which examines whether or not maintenance, inspection, repair or component replacement was performed on the low-yield-period apparatus and whether or not operating conditions for the low-yield-period apparatus have been changed before and after the significantly lower yield period identified by the low-yield detecting portion. It is this limitation found in each of the claims, as it is claimed in the combination that has not been found, taught or suggested by the prior art of record, which makes these claims allowable over the prior art.

The primary reason for the allowance of claim 8 is the inclusion of the limitation that said yield data includes at least one of a good product rate of finished products having experienced a series of manufacturing processes including the specific

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manufacturing process, a good product rate in the specific manufacturing process, a characteristic quantity representing in number a distribution of defectives in a wafer surface of a semiconductor wafer processed by one of the manufacturing apparatuses as a processed object, and a characteristic quantity representing in number a distribution of yields in one lot of a group of objects processed by one of the manufacturing apparatuses. It is this limitation found in the claim, as it is claimed in the combination that has not been found, taught or suggested by the prior art of record, which makes this claim allowable over the prior art.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Prior Art Citations

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

1) Morioka et al. (U.S. Pat. No. 5274434) is entitled "Method and apparatus for inspecting foreign particles on real time basis in semiconductor mass production line".

2) Morioka et al. (U. S. Pat. No. 6611728) is entitled "Inspection system and method for manufacturing electronic devices using the inspection system".

3) Ono et al. (U. S. Pub. No. 20020143483) is entitled "Inspection system,

inspection apparatus, inspection program, and production method of semiconductor devices".

4) Yoshida et al. (U. S. Pub. No. 20030176039) is entitled "Manufacturing system, measurement data collecting system, and measurement terminal apparatus".

Response to Arguments

6. Applicant's arguments received 07/21/05 with respect to claims 1, 5, 6, 9, 12, 13, 15, 18 and 19 have been considered but are moot in view of the new ground(s) of rejection.

Claims 1, 5, 6, 9, 12, 13, 15, 18 and 19 are rejected as new prior art reference (U.S. Pub. No. 20040073327 to Shimada et al.) has been found to teach the limitations argued by the Applicant. Detailed response is given in section 2 as set forth above in this Office Action.

Based on the new grounds, the allowable subject matter of claims 2-4, 10, 11, 16 and 17 as indicated in the previous Office Action has been withdrawn, and replaced by the rejections as set forth above in this Office Action.

Contact information

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Xiuqin Sun whose telephone number is (571)272-2280. The examiner can normally be reached on 6:30am-4:00pm.

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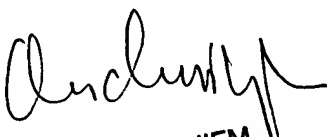
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Barlow can be reached on (571)272-2269. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

XS

September 30, 2005

Xiuqin Sun
Examiner
Art Unit 2863


MICHAEL NGHIEM
PRIMARY EXAMINER